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PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in or relating to Power-Operated Screw-Drivers and Nut-Runners

We, PYE LIMITED, a British Company, of Radio Works, St. Andrew's Road, Cambridge, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to power-operated screw-drivers and nut-runners and has for its object improvements in such apparatus.

More particularly, the present invention is concerned with feeding screws or nuts to the applying head of the machine from a feed device.

According to the invention there is provided a power-operated screw-driver, nut-runner or the like having a hopper containing a supply of screws or nuts and located at or near the upper end of the screw driver or nut-runner and secured to the body thereof, a delivery track from an exit aperture in said hopper and having a free end terminating at the screw-driving or nut-running bit to allow screws or nuts to be fed to said bit from said hopper by gravity, a retractable sleeve surrounding the upper portion of said bit and having two spring blades depending therefrom and terminating at their lower ends in pockets arranged beneath the bit and adapted to receive screws or nuts fed thereto from said track and screw- or nut-selector means attached to said sleeve for movement therewith and adapted to feed one screw or nut at a time beneath said bit.

It will be seen that the invention is applicable to apparatus for driving screws such as machine screws, self-tapping screws and the like, or for running nuts onto bolts but, in order that the invention may be more clearly understood, reference will now be made to the accompanying drawings which show one specific

embodiment thereof as applied to the feeding of screws to a screw-driver bit and in which:—

Fig. 1 shows a side elevation of a complete machine.

Fig. 2 shows a detail illustrating how a screw is held under the screw-driver bit before driving.

Fig. 3 shows a detail illustrating the relationship of certain parts during driving.

Fig. 4 shows the screw-locating pockets and

Fig. 5 shows the selector device.

In the drawings, an automatic power-operated screw-driver 1 is provided with a retractable sleeve 2 surrounding the shank 3 of its screw-driver bit and provided with means for holding the screw. The feed device is a hopper 4 which is connected by a suitable bracket 5 to the body of the screw-driver 1 and arranged to feed screws down a suitable track or chute 6 to an applying position beneath the screw-driver bit. The retractable sleeve 2 is provided with a pair of depending spring blades 7 terminating at their lower ends in a pair of recessed pockets 8 adapted to receive the screws. The track 6 feeds the screws between the blades 7 and above the pockets 8 into which they fall by gravity.

To assist in the feed of the screws to the pockets 8, a selector 9 is provided. This selector, which is shown more particularly in Fig. 5 is in the form of a strip of metal attached at its upper end to the retractable sleeve 2 by bolts 10. At its lower end it is bent back on itself in a long U-shape to form a well 11. At the side of the strip adjacent the pockets 8 it has a T-shaped slot 12 through which the screws pass. At the other side of the strip, the selector is formed with a slot 13 shaped with a tongue 14 to act as a screw stop. In the position shown in Fig.

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2, the sleeve 2 is in its lowermost position and the tongue 14 closes off the track 6 so that the screws are stopped in their travel down the channel. When the screw-driver is pressed down to engage a screw in the pockets 8, as shown in Fig. 3, the sleeve 2 remains fixed in vertical relationship, the base 15 of the selector contacting the workpiece 16. In that position the channel 6 attached to the screw-driver moves downwards to abut against the lower edges 13a of slot 13 so that it is no longer occluded by the tongue 14 and a screw may pass into the well 11 from track 6. However, the screw cannot pass to the pockets 8 because the track 6 has moved down the T-shaped slot 12 and the screw head abuts against the lower edges of the slot. After driving of the screw already in the pockets 8, pressure on the bit is released and the sleeve 2 retracts under pressure from its spring 17 whereupon the screw in the well 11 can pass through slot 12 by gravity and into the pockets 8.

When the screw-driver bit contacts the slot in the screw head, pressure is applied to the machine and the screw forces the pockets 8 apart under action of the spring blades 7; at the same time the pockets and selector base contact the work-piece 16 and are retracted vertically against the action of spring 17. When the screw is screwed home and the screw-driver removed from the location the pockets 8 spring back to their normal position and the next screw passes from well 11 into the pockets, as described above.

The screw-driver bit may be of the kind comprising a locating and holding means for use with specially shaped slots in the head of the screw. An example of a suitable bit and screws are those known under the Registered Trade Name of "Phillips Head".

The hopper 4 for containing the screws comprises a casing member 18 having a plurality of slots 19 running peripherally around its edge and dimensioned to allow passage of a screw therethrough. The casing 18 is mounted on a backing plate 20 having a pair of projecting arms, one of which is shown in Fig. 1, to form the bracket 5 for attachment to the screw-driver 1. The backing plate 20 also has a peripheral flange 20a partly covering the slots 19 to prevent the screws from escaping from the casing except at the place where the flange 20a is arranged to lead into the track 6. The casing 18 has a door 21 through which screws may be fed into the hopper, and attached to the backing plate 20 is a spindle passing through the casing 18 and having its outer end borne in an aperture in a knob 22 secured to the

casing 18 whereby when the screws have been fed into the hopper through the door 21 the casing 18 may be rotated or agitated by means of the knob 22 to bring the screws into substantially straight lines so that they may fall one at a time through an aperture 19 and the aperture in the base of the cover 20 into the track 6.

It will thus be seen that the invention provides means for automatically feeding screws to the screw-driver bit by gravity, selection being made from the screws in the track one at a time by means of the selector 9, as described above, so that the device is easy to operate and quick in action. It is intended in this embodiment that the screw-driver be held in a substantially vertical position to allow the screws to fall into the pockets 8 by gravity.

If desired, pneumatic means may be incorporated with the hopper for feeding the screws under air pressure into the guide-way or channel 6.

To remove the retractible sleeve 2 from the screw-driver spring-loaded retaining segments 23 are provided: these may be forced inwards by a tool passed through apertures 24 whereupon segments 23 become housed in the recesses 25, allowing the sleeve 2 to be withdrawn in a downwards direction.

It should be understood that the invention has only been described by way of example and that various modifications could be made to the specific details hereinbefore set forth without in any way departing from the scope of the invention.

What we claim is:—

1. A power-operated screw-driver, nut-runner or the like having a hopper containing a supply of screws or nuts and located at or near the upper end of the screw-driver or nut-runner and secured to the body thereof, a delivery track from an exit aperture in said hopper and having a free end terminating at the screw-driving or nut-running bit to allow screws or nuts to be fed to said bit from said hopper by gravity, a retractible sleeve surrounding the upper portion of said bit and having two spring blades depending therefrom and terminating at their lower ends in pockets arranged beneath the bit and adapted to receive screws or nuts fed thereto from said track, and screw- or nut-selector means attached to said sleeve for movement therewith and adapted to feed one screw or nut at a time beneath said bit.

2. Apparatus as claimed in Claim 1, in which the selector means has two portions adapted to bridge the end of the delivery track at two places, each of the two portions being provided with suit-

ably shaped and relatively located slots which allow screws to pass from the track through one portion into the space between the two portions in one position of the selector, and through the other portion and into the pockets in another position thereof.

3. Apparatus as claimed in Claim 1 or 2, in which the screw pockets are so shaped as to part on pressure being

applied to the screw-driver or nut-runner to allow the head of the screw or the nut to pass through the pockets.

4. A power-operated screw-driver, nut-runner or the like, substantially as hereinbefore described with reference to the accompanying drawings.

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PROVISIONAL SPECIFICATION

Improvements in or relating to Power-Operated Screw-Drivers and Nut-Runners

We, PYE LIMITED, a British Company, of Radio Works, St. Andrew's Road, Cambridge, do hereby declare this invention to be described in the following statement:—

The present invention relates to power-operated screw-drivers and nut-runners and has for its object improvements in such apparatus.

More particularly, the present invention is concerned with feeding screws or nuts to the applying head of the machine from a feed device.

According to the invention there is provided a power-operated screw-driver, nut-runner or the like associated with a feed device for screws or nuts to be driven, means for feeding a screw or nut from the feed device to an applying head of the driver, means for holding said screw in position beneath the applying head, and means for automatically moving said holding means out of the path of the screw or nut to release it from the machine after driving.

It will be seen that the invention is applicable to apparatus for driving screws such as machine screws, self-tapping screws and the like, or for driving nuts onto bolts but, in order that the invention may be more clearly understood, reference will now be made to a specific embodiment thereof as applied to the feeding of screws to a screw-driver bit.

In this specific embodiment, an automatic power-operated screw-driver is provided with a retractible sleeve surrounding its screw-driver bit and adapted also to perform the function of a holding means for the screw. The feed device is a hopper which may be connected by a suitable bracket to the body of the screw-driver and arranged to feed screws down a suitable track or chute to an applying position beneath the screw-driver bit. To this end, the track is connected through an aperture in the retractible sleeve surrounding the screw-driver bit in such manner that the screw falls by gravity

down the track and abuts against a stop so located on the retractible sleeve that when the screw terminates its travel, its slot lies underneath the screw-driver bit.

To assist in carrying out the invention the hopper is, therefore, preferably arranged in such manner that the track from it to the retractible sleeve runs parallel to the longitudinal axis of the machine so that the screw may fall by gravity, the track running parallel to the longitudinal axis of the machine to a point adjacent the screw-driven bit whereupon it turns inwards towards the bit and terminates, as mentioned above, in an aperture in the retractible sleeve.

The retractible sleeve is provided with a pocket for the screw which is made in two sections which are spring-operated in conjunction each with the other and with the retractible sleeve in such manner that as the screw-driver bit is pressed downwards to engage the bit in the slot in the head of the screw, the retractible sleeve telescopes inwardly, this action being arranged to open the two pockets to allow the passage of the screw and screw-driver bit through it.

The screw-driver bit may be of the kind comprising a locating and holding means for use with specially shaped slots in the head of the screw. An example of a suitable bit and screws are those known under the registered trade name of "Phillips Head".

The hopper may be of any desired form, for example, it may be of the kind containing a small trap door in its outlet to the track which is movable by hand to allow the passage of the screws down the track or it may be operated by the same type of power that actuates the machine. For example, the machine and hopper may be pneumatically-actuated.

If desired, for certain fields of operation, the hopper may be separate from and not connected to the screw-driver machine but in the preferred embodiment in order to provide a compact and com-

pletely portable arrangement; the hopper is so connected to the machine.

It should be understood that the invention has only been described by way of example, and that various modifications could be made to the specific details here-

inbefore set forth without in any way departing from the scope of the invention.

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